Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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D-Dimer and Serum Ferritin as an Independent Risk Factor for Severity in COVID-19 Patients

Ali M. Hussein [a,*], Zhala B. Taha [b], Ahmed Gailan Malek [c], Kamgar Akram Rasul [c], Dur Qasim Hazim [c], Reman Jalal Ahmed [c], Usama Badraden Mohamed [c]

[a] Department of Biomedical Sciences, Cihan University-Erbil, Kurdistan Region, Iraq
[b] Department of Forestry, College of Agricultural Engineering Sciences, Salahaddin University, Erbil, Kurdistan, Iraq
[c] Department of Biology, Cihan University-Erbil, Kurdistan Region, Iraq

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ABSTRACT

Ferritin is an intracellular blood protein that contains iron, covid-19 diseases is an infectious disease caused by a virus called corona virus, the infected person mostly experiences mild to moderate respiratory illness ferritin level in blood mostly depend on severity of the covid-19 disease. Ferritin level could be used as an indicator for the covid-19 disease. Within 120 corona virus patients that used as individual in this study, the ferritin level in the blood were tested, also each of (D-Dimer, ESR, C.R protein) Depend on the results, the patients with over 60 years have a high ferritin level also the d-dimer were abnormal with 65% higher than normal range.

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1. Introduction

The body contains iron in the form of ferritin, which is an intracellular protein composed of 24 subunits circling an iron core containing 4000–4500 iron atoms [1]. Ferritin is an intracellular protein composed of 24 subunits surrounding an iron core containing 4000–4500 iron atoms. Ferritin is a mediator for immune dysregulation, especially in hyper-ferritinemia, with direct immune suppressive and pro-inflammatory effects that cause cytokine storms [2]. The cytokine storm syndrome causes dangerous outcomes in covid-19 disease and the prevalence of the symptoms is depending on the cytokine cloud syndrome [3]. Ferritin levels in blood are common in stable individuals between the ages of 3 months and 16 years (20–200 ng/mL) between the ages of 20 and 60 years (13–150 ng/mL) and between the ages of 20 and 60 years (30–400 ng/mL). Covid-19 disease is an infectious disease that has been declared a global public health emergency by the World Health Organization, with over 3.500.000 cases and 243.043 deaths reported globally almost since inception in Wuhan China. The bulk of covid-19 disease patients had asymptomatic or mild influenza-like illness [4]. Serum ferritin levels are closely linked to the incidence of covid-19 disease [5]. Treatment with iron chelators is one potential method for lowering serum ferritin levels in the body. Deferoxamine medication may also be used because it is a non-toxic iron chelator that has been approved by the FDA and has an effect on long-term iron chelation therapy [6]. Manipulation of serum ferritin levels may be used to reduce nutritional iron [7,8].

2. Methodology

Ferritin is identified as prognostic and predictive marker for liver injury [9]. The fight against covid-19 pandemic, attention to ferritin is increasing as risk factor for prognosis of covid-19 . The ferritin is abnormal with the severity of covid-19 disease, but its value remains to be explored [10,12]. According to the diagnosis and the treatment of novel corona virus with these symptoms, Breath shortness, Oxygen saturation below than 93% and arterial partial pressure of oxygen. Liver injury patients could have elevated levels of aspartate aminotransferase, and alanine transaminase [11,13]. The samples for the ferritin blood test is a

* Corresponding author.
E-mail addresses: ali.m.hussein@cihanuniversity.edu.iq (A.M. Hussein), zhala.taha@su.edu.krd (Z.B. Taha), ag202118002@cihanuniversity.edu.iq (A. Gailan Malek), ka202118040@cihanuniversity.edu.iq (K. Akram Rasul), dq202118015@cihanuniversity.edu.iq (D. Qasim Hazim), rj202118019@cihanuniversity.edu.iq (R. Jalal Ahmed), ob202118005@cihanuniversity.edu.iq (U. Badraden Mohamed).

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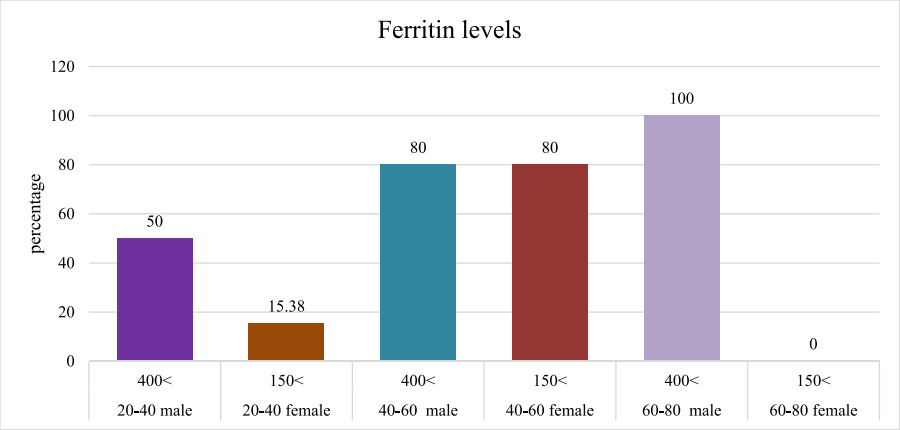

Fig. 1. Shows Ferritin levels with in correlations with gender and age.

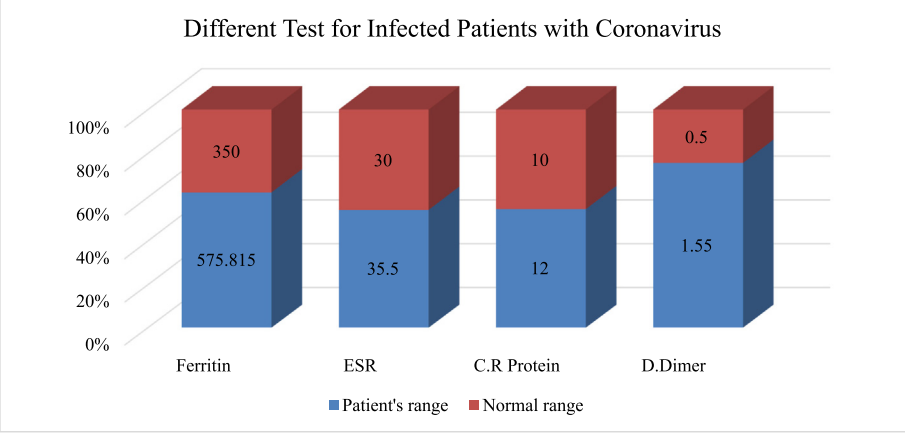

Fig. 2. Shows Ferritin, ESR, C. R Protein, and D. Dimer levels.

venipuncture samples. The date of beginning points of viral clearance is called admission date, and the date of ending point of viral clearance is called negative detection of covid-19 RNA [14] (Fig. 1. Fig. 2).

3. Results

Statistical programs used for analyzing the results with $p < 0.05$, the following data were collected and arranged in different figures. Level of ferritin changed with the age of the patients, also (ESR, D-Dimer, Ferritin, C.R protein) showed different levels in comparison with the control group that was the normal range. In first group patients (20–40 years' male) the ferritin was 50% more than 400 which is the normal range. Patients of the second group (20–40 years' female) the ferritin was 15.38% more than 150 which is normal range. In third group (40–60 years' male) the ferritin was 80% more than 400 which is normal range. The fourth group (40–60 years' female) the ferritin was 80% more than 150 which is normal range. In fifth group (60–80 years' male) the ferritin was 100% more than 400 which is normal range. In the first test between (30–55 years' male & female) the ferritin was (575.815) more than 350 which is normal range. The second test between (30–55 years' male & female) the ESR was 35.5 over than 30 which is normal range. The third test between (30–55 years' male & female) the C.R Protein was 12 more than 10 which is normal range. The fourth test between (30–55 years' male & female) was 1.55 more than 0.5 which is normal range.

4. Discussion

The blood sample was drawn in 101 infected patients with Covid-19 disease, ferritin levels in the blood depend on the severity of the infection on the patient for study data of 101 patients that infected with covid-19 disease were analyzed the elevated range and normal range of ferritin in the patients labelled and matched. When compared to ferritin, which may serve as an easy-to-use predictor for covid-19 disorder, the model combination did not offer a positive prediction on infection incidence or liver damage [15]. Ferritin can serve as a marker for liver damage, serious illness, and course of treatment. Ferritin is an acute phase protein which can be discharged from destroyed hepatocytes [10,16,17]. Extra ferritinemia may be caused by impaired liver activity or a metabolic syndrome [18]. Covid-19 patients with abnormal ferritin levels has more risk of liver injury and severe illness, previous studies also found that liver injury is common in covid-19 patients [19–21]. Summary of these observations is indicative of the fact that early analysis of ferritin can efficiently have recognized liver damage, catastrophic disease, and prognosis of covid-19 patients. Patients with unusual ferritin level should be considered [10,22].

5. Conclusion

The Blood parameter shows that the ferritin level will increase in second week after affecting with Covid-19, also other parameters will be changed according to the normal range, such as D-

Dimer, ESR, C.R protein. Depend on our case study, these levels will be change because they got Paracetamol vial 500 ml daily twice in hospital that affect the liver function.

CRediT authorship contribution statement

Ali M. Hussein: Conceptualization, Methodology. **Zhala B. Taha:** Writing - original draft. **Ahmed Gailan Malek:** Software, Investigation. **Kamgar Akram Rasul:** Writing - review & editing. **Dur Hazim Kasim:** Visualization. **Reman Jalal Ahmed:** Data curation. **Usama Badraden Mohamed:** Supervision.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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